

TERRA

THE NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY

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TERRA

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COVER: City scene with psittacines: A pair of Yellow-headed Parrots (*Amazona oratrix*) traveling between roost and feeding sites in Santa Monica. This parrot species is often seen flying over the freeways of the west side of Los Angeles. Detail of a painting by Jonathan Alderfer.

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MUSEUM ON THE MOVE

WEINGART FOUNDATION MAKES \$1 MILLION GRANT: SEVENTY-FIFTH ANNIVERSARY CAMPAIGN REACHES \$6 MILLION MARK. A \$1 million grant from the Weingart Foundation of Los Angeles toward the Hall of Evolving Life has pushed the Seventy-Fifth Anniversary Campaign past the \$6 million mark.

The 40,000 square foot hall, the largest of three new permanent exhibits to be funded through the campaign, will house an ambitious new sequence of displays that will explain and illustrate how the animal and plant life of our planet has changed over the past three billion years. The exhibits will include an exciting sequence of reconstructed habitats, each portraying the diversity of life at critical times during the geological past. There will also be a series of displays explaining the nature of the changes that have occurred in different groups of animals and plants during the course of time and in response to variations in climate and environment.

Currently planned as an architecturally striking structure fronting Exposition Boulevard, the Hall of Evolving Life will contain three large exhibition galleries. "The new structure will be a tangible symbol of the museum's public presence and vitality in service to the community," said C. B. Thornton, Jr., Natural History Museum Foundation Trustee and Chairman of the Hall of Evolving Life Committee. The hall will be named in memory of Mr. Thornton's father, Charles B. Thornton, founder of Litton Industries.

The hall's focus will be the Age of Dinosaurs Gallery, in which dinosaur skeletons will appear either as individual exhibits or incorporated with life-size reconstructions of these extinct creatures in spectacular habitat groups. Three such habitat groups are currently envisaged—a fern forest scene of the Jurassic Period (144 to 208 million years ago) featuring *Stegosaurus* and *Allosaurus*, a pine forest scene of the Cretaceous Period (65 to 144 million years ago) featuring *Tyrannosaurus*, *Triceratops*, and duck-billed dinosaurs, and a view of life in the Cretaceous oceans, which will feature gigantic marine reptiles typi-

cal of that period. Also on display will be exhibits featuring dinosaur eggs and baby dinosaurs, flying reptiles, the earliest birds, the earliest mammals, and other animal and plant fossils that typify life in the Mesozoic Era.

Adjoining the Age of Dinosaurs Gallery will be the Gallery of Life on Earth, which will portray the Earth's beginnings, the diversity of life in the primeval oceans, the conquest of land, and other events leading to the Age of Dinosaurs. A third gallery will be devoted to more recent earth history—the Age of Mammals and Birds and the Origin and Evolution of Man.

The estimated cost of designing and constructing the hall and of preparing the exhibits for it is \$10 million.

SEVENTY-FIFTH ANNIVERSARY CAMPAIGN PLEDGE OF \$1 MILLION FROM TIMES MIRROR FOUNDATION. A pledge of \$1 million, the single largest corporate commitment ever received by the museum, has been made as part of the Seventy-Fifth Anniversary Campaign by the Times Mirror Foundation to fund the design and construction of the Hall of Native American Cultures.

"In recognition of this major gift, the hall will carry the Times Mirror name," said Richard Call, the campaign's chairman. "Times Mirror has demonstrated a high level of corporate concern for the quality of life in greater Los Angeles," he continued. "It has also set the pace and tone for other members of the corporate community to look toward as they consider their participation in the campaign. We are most grateful to Times Mirror for this tremendous investment in our endeavors."

Said Natural History Foundation Trustee and Native American Hall Committee Chairman William A. Mingst, "The Natural History Museum has a long-standing tradition of interpreting the Native American cultural heritage. The new Hall of Native American Cultures will reaffirm this commitment with a dramatically expanded presentation of traditional and contemporary Native American cultures."

The native peoples of California, Nevada, Arizona, and New Mexico will be represented in the exhibit. Within this broad regional scope, the

hall will focus on southern California and will trace the history of Indian communities in the Los Angeles region from prehistoric times through the establishment of missions by the Spanish to the present.

UNOCAL PROVIDES FOR THE GREAT BIRD HALL. A Unocal Foundation gift to the Natural History Museum will provide \$150,000 over a three-year period for the construction of the California Condor Habitat, one of three major exhibits planned for the museum's Great Bird Hall.

"Unocal is committed to preserving California's fragile ecology and the condor in particular. This is especially appropriate because the corporation was founded in 'Condor Country' near Santa Paula," said John F. Harrigan, Natural History Museum Foundation Trustee and Chairman of the Great Bird Hall Committee. "This gift is a fitting tribute to that commitment."

SOUTHERN CALIFORNIA GAS COMPANY SUPPORTS CAMPAIGN. The Southern California Gas Company recently became the fourth major local corporation to invest in the Seventy-Fifth Anniversary Campaign with a contribution of \$75,000. Gas Company Vice Chairman Charles O. Parker II, who also serves as the campaign's vice chairman, said the company was especially pleased to allocate its grant toward the Hall of Evolving Life.

GREAT BIRD HALL DESIGN CONTRACT AWARDED. The Natural History Museum has awarded a contract to Promotion Products, Inc., of Portland, Oregon, to design the Great Bird Hall. The nationally known company was selected from a field of fourteen competing firms; their past projects include the design of the Boeing Museum of Flight in Seattle and the State of Oregon Exhibit for Expo 86 in Vancouver. "We see this exhibit as a real breakthrough in terms of display and teaching techniques," said Dr. Ralph Schreiber, the museum's Curator of Ornithology. "This design will eliminate the 'stuffed birds in glass cases' approach." While the main public focus of the Great Bird Hall is to give visi-

(Continued on page 30)

SOUTHERN CALIFORNIA'S EXOTIC BIRDS

by KIMBALL L. GARRETT



Noisy flocks of Canary-winged Parakeets (*Brotogeris versicoloris*) are frequently seen in the Los Angeles Basin, especially in the San Pedro area of the Palos Verdes Peninsula.

Paintings by JONATHAN ALDERFER

It is the late afternoon rush hour in Los Angeles. Four-wheeled creatures crawl in erratic fits and pauses upon the concrete pathways where a daily cycle is played out. The Santa Monica Freeway is especially knotted today with belching vehicles, heated tempers, and overheated engines. Rays from the dropping sun slip under windshield visors, through dark sunglasses, and into squinting eyes. Radio traffic reports remind drivers of their situation, while distance is slowly marked as familiar overpasses inch closer.

Across the inbound lanes, themselves congested, and above the wires and assorted odd edifices that are the architecture of Los Angeles, two tiny distant dots appear against the hazy late afternoon sky. Approaching, enlarging, the dots become shapes as they catch the eyes of a motorist. Even closer, almost over the river of cars now, the shapes become

birds, flying almost wingtip to wingtip with rapid, shallow beats of oddly bowed wings. Pigeon-sized, stocky, and large-headed, the birds continue their direct, northward flight across the glare of the western sky. An arcing glide brings them against the backdrop of Century City, and the more favorable angle of light reveals to the now captivated commuter plumage of a brilliant green—unmistakable parrot green—setting off a bright yellow head. The birds descend past the condominiums flanking the freeway, and the motorist is simultaneously beckoned forward by an insistent honk of a horn. The paths of Los Angeles commuters have crossed: home-bound humans and Yellow-headed Parrots.

Commuting parrots in Los Angeles? Perhaps this scene should be described from the point of view of the parrots. Gregarious birds, given to traveling in pairs or flocks, parrots wander widely in search of productive feeding sites, re-

turning to protected roosts for the night. These two Yellow-headed Parrots have spent the better part of the day unseen in the foliage of mature trees, crushing eucalyptus capsules and other fruits with their powerful bills. They have explored a particularly lush forest bordering a golf course and have selected fruit from a variety of trees. Keeping in touch with one another with stuttering, laughing calls remarkably suggestive of a human chuckle, the birds have left their feeding area, pausing on the bare upper branches of a sweet gum to perform some raucous acrobatics and a touch of mutual preening. Taking flight again, the birds make their way over the concrete savannah, where tall palms, groves of eucalyptus and pines, deodars and magnolias, maples and fig trees form galleries along asphalt rivers. Close-mown grasslands, shrubby hedgerows, backyard orchards studded with fruit, and bright blue swimming pools unfold un-

der the path of the commuting parrots. The cries of the other evening commuters—four more Yellow-headed Parrots to the north, a pair of Lilac-crowned Parrots joined by a larger Yellow-headed cutting through the orange haze of the Culver City sky to the south—raise psittacine Cain above the steady roar of the concrete and metal river below. The destination lies ahead—a thicket of palms and eucalyptus in a small urban park, roost site for the night.

The parrots of Los Angeles are only a part of an artificial biota—plants and animals brought together directly or indirectly through human agency—that has developed in urban and suburban areas over many decades. Indeed, humanity's activities have affected the distribution and abundance of Earth's fauna and flora for thousands of years. A facet of these man-induced biogeographic changes has been the introduction of exotic species to new regions or continents. The coastal slope of southern California has proven to be a haven for exotics, hosting a potpourri of introduced and escaped animal species living in a suite of botanical communities bearing little resemblance in species composition or physical structure to native plant associations.

It is hardly surprising that this condition should arise, given a climate free of physiologically demanding extremes. Although rainfall averages less than a foot and a half per year in most of coastal southern California, importation of water (itself a rather exotic resource) allows for abundant crops, gardens, shade trees, and parks. Temperatures that rarely dip below freezing promote the establishment of tropical and subtropical plants, many of which bear flowers and fruit at seasons when our native plants are more dormant. Groups originating in distant regions, such as Australia's eucalypts, now dominate the scene. The benign climate acts as a magnet for humans as well, and with the swelling human populations come the attendant introductions of exotic plants and animals. Horticultural and avicultural activities thrive in southern California's climate, and along with them the inevitable liberation and establishment of many species.

Southern California's major seaports and busy border crossings with Mexico render it a key area for both the legal and illegal entry of wildlife. The magnitude of this trade increases the likelihood of accidental release, and it is known that bird smugglers will occasionally liberate a shipment to avoid arrest. The thriving bird trade, expanding human population, and mild climate also characterize southern Florida, and that region in fact has an even greater share of established exotic birds than southern California. The abundance of exotics in south Florida is revealed by the recent documenta-



tion of roosts of up to eight thousand budgerigars (the common Australian "parakeet") in a small area north of Tampa. In a recent issue of the Audubon Society's journal *American Birds*, the Florida regional editor remarked that "the parrot fauna of Florida grows apace, with new species appearing almost yearly, and the established species appearing in new localities continually. So far the parrots and parakeets seem to be remaining in urban and suburban habitats and feeding on exotic plants, but the date that one of them discovers an agricultural crop cannot be too far off."

The exotic birds of southern California are superimposed upon a native avifauna of more than 510 species (a figure that includes breeding species, seasonal visi-

tors, and rare strays). In shifting the region's environment toward an artificial amalgam of exotic plant species, man has simultaneously decimated most natural habitats. Parrots now fly over lowland basins where the songs of cuckoos, Bell's Vireos, and other denizens of long-lost willow bottomlands are but a memory. Do these exotic birds in some ways help compensate for the loss of our native biota? Or are they, in fact, insidious threats to what little remains of our natural heritage? What are their economic effects, especially with regard to agriculture? What do they tell us, over time, about the population genetics and adaptations of populations in a novel environment? These and other questions have begun to stimulate a burgeoning interest in our introduced fauna.



City scene with psittacines: A pair of Yellow-headed Parrots (*Amazona oratrix*) traveling between roost and feeding sites in Santa Monica. This parrot species is often seen flying over the freeways of the west side of Los Angeles.

John L. Long, in his book *Introduced Birds of the World*, lists several reasons why exotic bird species have been introduced. We must first distinguish between the intentional and the accidental. Intentional introductions are frequently initiated through a belief, more often than not mistaken, that the introduced species will somehow tip an ecological balance in man's best interest. Most early importing of the House Sparrow (or "English" Sparrow) into North America took place in the belief that they controlled cankerworms and other insect pests. In the ensuing 120 years the House Sparrow has become abundant around human habitation throughout North America, though evidence of the species' success in the control of insect pests is lacking.

Birds may also be introduced for purely aesthetic reasons. Europeans, and particularly the British, have long attempted to establish familiar birds in distant colonies. Through the efforts of various "acclimatization societies" in the nineteenth century, several successful (and many more unsuccessful) introductions occurred in North America, New Zealand, and elsewhere. The European Starling, now abundant in North America and not without its deleterious effects on our native birds, owes its origins on this continent to people intent upon introducing all bird species mentioned in Shakespeare's works into New England! Various game species are frequently introduced for sport hunting; this has been the case with the Chukar (from southern Eurasia) and the Ring-necked Pheasant

(from Asia), both of which are well-established in California, as well as with the locally established Wild Turkey (never native to California).

Unintentional introductions of birds generally occur as a by-product of avicultural activities, as noted earlier. To gauge how important a source of exotics this might be, it is instructive to review the statistics on the importation of birds into the United States, as monitored by the U.S. Fish and Wildlife Service. In 1971, for example, nearly one million birds were legally imported (and so declared). This figure included 236,000 parrots (of a variety of species) and 196,000 canaries. The parrot species most commonly imported into the United States between 1968 and 1972 was the Canary-winged Parakeet of South America (263,000

**Three
Black-hooded
Parakeets
(*Nandayus nenday*) perched
in a western
sycamore.
This is but
one of the
many exotic
bird species
that have
begun to
establish a
foothold in
the urban and
suburban
habitats of
southern
California.**



birds over four years). The legal importation of birds into the United States has been cut back in recent years, primarily in response to fears of the spread of avian diseases such as Newcastle's. Such restrictions should help stem the decline of wild populations of many bird species that have been overexploited for the cage bird trade; a massive illegal trade in birds continues, however, and the impact of this activity must be considered along with the legal importation figures.

John Long lists a minimum of ninety-eight introductions of exotic birds into North America, of which twenty-five have resulted in the species' successful establishment and an additional twelve have resulted in possible establishment. Long did not list several exotics seen regularly in southern California for want of data on their population sizes and breeding status, but as ornithologists, birders, and government agencies begin to amass data on exotics of the region, it is becoming clear that the list of species on the brink of establishment is a long one. In 1973 John William Hardy summarized the limited data on exotic birds in southern California in an article in the *Wilson Bulletin*. Among the species for which he presented data were the Common Peafowl (with a small feral population on the Palos Verdes Peninsula), three species of doves, a frugivorous bird known as the Red-whiskered Bulbul from tropical Asia (established locally in the San Gabriel Valley), and at least seven species of parrots. The abundance of parrot species of the genus *Amazona* (commonly referred to as amazon parrots) in the San Gabriel Valley prompted a Master's Thesis by Jeffrey B. Froke of Humboldt State University. Many of Froke's findings are noted in the species treatments that follow.

The Parade of Exotic Birds. In southern California there are dozens, and perhaps hundreds, of exotic species of birds that escape or are released into the wild; any of these could potentially establish feral populations. For a species to become established, the number of colonists (escapees or released birds) must exceed some critical minimum, and chances of establishment increase with continued recruitment. Importantly, the potentially successful immigrant must also find habitats that offer a physical and biotic environment conducive to survival and successful reproduction. The species most commonly imported into the United States is the canary, yet no feral populations of canaries (which must escape with regularity) have become established. The canary's failure to become established may have several explanations: very low densities of escaped birds, lack of some critical ecological resource, an inhospitable physical environment, and competition with native seed-eating species.

A key factor in southern California's attraction to exotic bird populations is the botanical environment humans have created in their urban and suburban settings. This artificial flora differs sharply from native habitats of the region in a variety of factors avian ecologists consider fundamental to the structuring of bird communities: plant species composition, vegetation profile and structure, fruiting seasonality and predictability, and microclimate. Few exotic bird species have extended their ranges beyond the ragged borders of this city and suburb landscape. The very successful European Starling, which invaded southern California from the north and east in the late 1940s, is an exception (with unfortunate results for populations of native cavity-nesting species, whose nest sites are usurped by aggressive and abundant starlings). The species that we will look at are almost entirely restricted to the artificial landscapes of southern California's human population centers.

The Amazon Parrots. Certain species from this large genus of neotropical parrots have become conspicuous exotics in the greater Los Angeles region. The three species that appear to be established are the Yellow-headed Parrot (*Amazona oratrix*), the Red-crowned, or "Green-cheeked" Parrot (*A. viridigenalis*), and the Lilac-crowned Parrot (*A. finschi*).

The Yellow-headed Parrot is part of a species complex distributed from tropical lowland Mexico through northern South America. Most feral birds in southern California show entirely yellow heads, a trait of the Mexican populations; immature birds, with green heads, are also frequently seen. The western portion of the Los Angeles basin, from central Los Angeles and Hollywood west to Santa Monica, and from the base of the Santa Monica Mountains south through Culver City, forms the center of distribution of Yellow-headed Parrots in the region. Flocks of up to thirty birds, commuting to or from feeding sites, are frequently reported on the Westside. These flocks are often joined by individuals of other parrot species. Jeff Froke's studies of amazons in the San Gabriel Valley, northeast of downtown Los Angeles, yielded a very conservative estimate of eighteen Yellow-headed there in the mid-1970s. In that area Yellow-headed were outnumbered by Red-crowned Parrots (a minimum of fifty birds) and Lilac-crowned Parrots (at least twenty-two birds). Small numbers of these and other *Amazon* species are reported from other areas of southern California, including the San Bernardino Valley and several coastal communities. Quantitative data from the seven years since the completion of Froke's study have been few but the frequency with which *Amazon* parrot flocks are re-

ported to local Audubon Societies and museums suggests that their numbers may continue to increase.

Successful nesting has been documented for all three of the *Amazon* parrot species. Cavity nesters, these parrots prefer old woodpecker excavations and natural cavities in trees such as the blue gum eucalyptus. Crevices among dead, matted fronds of fan palms are also used. Has successful breeding contributed significantly to the maintenance (and increase) of parrot populations in the region, or are continuing escapes and releases of these long-lived birds the more important factor? Studies that confirm the magnitude of population recruitment through breeding are awaited.

Parrots feed almost exclusively on seeds and fruits. Their diet at a given season depends on which trees in their habitat are fruiting. English walnuts, sweet gums, junipers, eucalyptus, and *Prunus* (plums, apricots, and cherries) are all seasonally important: one imagines that few species of fruit trees have not been sampled by the *Amazon* parrots. Among the few native California trees to attain prominence in the diet of feral parrots is the western sycamore, *Platanus racemosa*. Native canyon bottom habitats containing sycamores (but lacking exotic tree species) do not appear to provide sufficient food, however, to support amazons.

A striking attribute of *Amazon* parrots is their raucous and incredibly loud vocal repertoire. Their calls frequently catch the attention of pedestrians in the San Gabriel Valley and on the Westside, and it is not an uncommon sight in these areas to see a sidewalk traveler's head turned skyward at the odd sight of urban parrots. Preroosting assemblies of parrots often perform a humorous suite of vocal and acrobatic shenanigans.

Other Parrots and Parakeets. A small species that has established populations locally through the Los Angeles area is the Canary-winged Parakeet (*Brotogeris versicolorus*), native to northern South America. Birders have regularly noted several of these parakeets on the Palos Verdes Peninsula. A small flock with a fondness for kapok seed pods frequently graces the trees planted adjacent to the National History Museum in Exposition Park.

Black-hooded Parakeets, or "Nanday Conures" (*Nandayus nenday*) exist in small, local populations in the coastal communities. Also a South American native, this species shares the rather catholic fruit-eating diet of other parrots. In the Brentwood and Pacific Palisades areas west of Los Angeles, small numbers have taken to foraging and nesting in sycamore groves in the canyons of the Santa Monica Mountains, although always adjacent to the lush, exotic plantings of the residential areas.

Unlike most of our other feral parrots, the Rose-ringed Parakeet (*Psittacula krameri*) is native to the Old World, occurring in both Africa and India. In our region they share a fondness for sycamores with the Black-hooded Parakeet; a flock of over twenty birds resides in the sycamore groves at lower Zuma Canyon, near Malibu. Small numbers are noted at other localities scattered throughout the Los Angeles Basin, and the species has become established in many other parts of the world, including southern England.

Many other species of the parrot family fly free in southern California. Most of these represent isolated incidents of escape or release, but there may be more species that are marginally established besides the Yellow-headed Parrots, Red-crowned Parrots, Lilac-crowned Parrots, Canary-winged Parakeets, Black-hooded Parakeets, and Rose-ringed Parakeets.

Doves. The Rock Dove or Domestic Pigeon (*Columba livia*) has lived in North America as man's commensal since the early part of the seventeenth century. Substituting buildings and other structures for its original sea-cliff habitat, this successful species is now perhaps the most conspicuous element of the urban avifauna of southern California. But two turtle-doves, of the genus *Streptopelia*, have also been introduced into southern California.

The Spotted Dove (*S. chinensis*) of southern Asia has become abundant throughout urban and suburban southern California since its introduction just prior to 1920. Although it has spread widely, from Bakersfield to San Diego, and from Santa Barbara to the westernmost deserts, it has gained only a marginal foothold in native woodland habitats and no significant negative effects on our common native doves (the Mourning Dove and the Band-tailed Pigeon) have been demonstrated. It is uncertain whether the early introduction of Spotted Doves into southern California (originally in the Hollywood area) was intentional or resulted from the escape of caged birds.

The Ringed Turtle-Dove (referred to as *S. risoria* but in fact a semi-domesticated form of one of the collared turtle-doves of southern Eurasia or Africa, *S. decaocto* or *S. roseogrisea*) is seen widely through the urban regions of southern California, but most sightings probably pertain to escaped individuals of this popular aviary species. Small breeding populations have long persisted around downtown Los Angeles, with Olvera Street and the old Plaza being the most consistent current locality. Ringed Turtle-Doves have been important subjects of laboratory studies on avian reproductive behavior, and the existence of small feral populations provides the potential for extending such research into a less restricted setting (as has been done by

Natural History Museum Research Associate Cathleen Cox). Other feral populations of this species occur around human settlements in many parts of the world.

Bulbuls and White-eyes. Two small fruit-eating song birds have caused some concern in recent years within the California Department of Agriculture. One is the Oriental White-eye (*Zosterops palpebrosa*), a member of a family of tiny birds restricted to the Old World tropics. Feared to have great potential for damaging crops of soft-skinned fruits, Oriental White-eyes have gained marginal establishment in the lush plantings of parks and residential areas around San Diego. Population studies and eradication efforts are in progress and nearly 400 birds have been removed from the wild in recent years. A closely related species, the Japanese White-eye (*Z. japonicus*), has become abundant in the Hawaiian Islands since its introduction there in 1929.

The Red-whiskered Bulbul (*Pycnonotus jocosus*) belongs to a large family also native to the Old World tropics. Slender, crested thrushlike birds of wooded regions, Red-whiskered Bulbuls were first detected in the San Gabriel Valley in the late 1960s. Especially to their liking are

the lush plantings on the grounds of the Huntington Library and the Los Angeles County Arboretum. Recognizing the bulbuls' potential for damaging garden and commercial fruit crops, government agricultural agencies initiated an eradication program soon after the birds' discovery. Bulbuls have reappeared, presumably through successful breeding, at roughly the same rate at which they have been dispatched, and a population in the dozens persists today. As would be expected of a tropical fruit-eating species, bulbuls have not expanded beyond the limits of the lush "artificial" woodlands of the Los Angeles suburbs.

Finches. The various groups of finch-like birds, including the weavers, Old World sparrows, waxbills, canaries, cardinals, and buntings, together form a major element of the cage bird trade and contain numerous species that have become successfully established as exotics throughout the world. Waxbills and other finches of the family Estrildidae frequently appear in parks, at bird feeders, and in rank weedy fields in coastal southern California, but reports of established populations are few. Several species of weavers also appear as escapees (three species of weavers known

as "bishops" have been seen in a single day in the Sepulveda Flood Control basin in the San Fernando Valley!) but again without successful establishment. The very successful Old World House Sparrow excepted, exotic finches have not thrived in our region.

The Northern Cardinal (*Cardinalis cardinalis*) is a common native in the southern and eastern United States and Mexico. It was introduced into southern California in the early part of this century but maintains a breeding population only in the riparian thickets bordering the San Gabriel River in the Whittier Narrows area east of downtown Los Angeles. This population is unique among introduced ones in the region in that it is established in a relatively natural plant community (dense bottomland thickets). Current population estimates for the San Gabriel River cardinal population do not exceed twenty pairs. Native populations of cardinals extend west on Arizona's Sonoran Desert to the Colorado River.

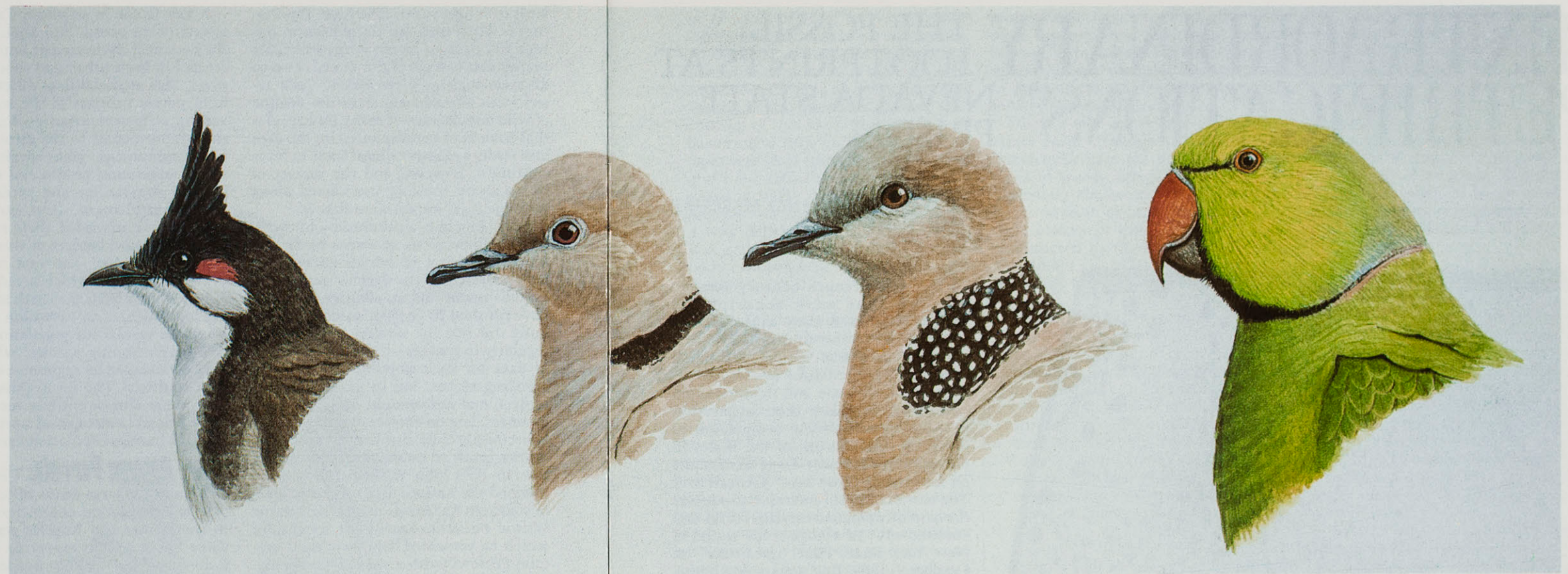
The status and distribution of exotic bird species in southern California is in constant flux. Populations that we may deem established today may quickly disappear through environmental change or disease. In particular, tropical species are

especially susceptible to the harmful effects of prolonged cold spells. Additional species will gain footholds, though it is difficult to predict exactly which exotics will be woven into the fabric of our suburban avifauna within a decade or two. It is clear, however, that man's influence on the diversity and composition of southern California's bird life will be felt more and more strongly. This influence will be manifested in a variety of ways: first, through a continued negative impact on bird species adapted to specialized native habitats. Second, the impact will be seen in the ecological adjustments of native species to the increasing dominance of exotic vegetation in the region; a trend that has already become evident is the overwintering of growing numbers of individuals of certain species of orioles, tanagers, warblers, and hummingbirds in groves of winter-flowering eucalyptus and other exotics (these are birds that historically have migrated to Mexico and Central America for the winter). Man's influence will be felt in a more positive way, with funding and intelligent planning, through the careful nurturing of declining populations with management and with habitat protection and restoration. And, finally, we will continue to observe the impact of the on-

going liberation of exotic species and the shaping of an artificial set of urban and suburban habitats in which these exotics will find sanctuary. Considering these factors, one cannot help but wonder what southern California's avifauna in the twenty-first century will be like.

Kimball L. Garrett has been the Ornithology Collections Manager at the Natural History Museum of Los Angeles County since March 1982. He has authored, with Jon Dunn, *Birds of Southern California, Status and Distribution, the most authoritative recent treatment of birds in the region. An incurable bird-watcher even as a child growing up in the Los Angeles area, Garrett developed an early appreciation for the significance of the exotic element of the area's birdlife. He can be recognized during his commutes on the Santa Monica Freeway by his skyward gaze.*

Artist Jonathan Alderfer attended the University of Chicago and the Cooper Union in New York. He is currently illustrating a bird identification book authored by Jon Dunn and Kimball Garrett, to be published by the Los Angeles Audubon Society. Having lived in Los Angeles for eight years, he is no longer surprised by the occasional backyard parrot.



Established or nearly so: Some exotics from the Los Angeles area. From left: Red-whiskered Bulbul (*Pycnonotus jocosus*), Ringed Turtle-dove (*Streptopelia risoria*), Spotted Dove (*Streptopelia chinensis*), and Rose-ringed Parakeet (*Psittacula krameri*).

“EXTRAORDINARY PETRIFICATIONS” THE FOSSIL FOOTPRINTS AT NEVADA STATE PRISON

by JORDAN D. MARCHÉ II



Nineteenth-century Americans were occasionally stirred into high-pitched frenzies over the announced “discoveries” of native “petrified” human remains. These colorful hoaxes, perpetrated both in stone and in story, often seem to have taken their inspiration from an overwhelming compulsion to prove the literal truth of the Bible; in particular the phrase, “There were giants on the earth in those days” (Genesis 6:4). The best example of such an attitude was the carefully planned carving, burial, and “rediscovery” of a huge stone statue in New York State. First “unearthed” on October 9, 1869, this remarkable figure, which looked as if it had been petrified in a moment of mortal anguish, became widely known as the Cardiff Giant. It was placed on exhibit and even toured the major eastern cities, where it created a sensation. The excitement was short-lived, as the fraud was exposed on scientific grounds by Yale University Professor Othniel C. Marsh, and eventually the story of its entire fabrication was also revealed.

Still another famous hoax that achieved national attention was that deliberately composed by Mark Twain. His story, “The Petrified Man,” appeared in the Virginia City, Nevada, *Territorial Enterprise* of October 12, 1862, and ridiculed all such contemporary forgeries as well as a Humboldt, Nevada, Mining District judge. His story backfired, however, when the yarn itself was taken to be the truth. He later tells us of the setting in which his plot was drawn:

Map of the complete fossil footprint exposures as drawn by geologist Addison Coffin in 1889. Item 4 on the key denotes footprints left by “giant man.” Almost two dozen species of birds and mammals—including mastodonts, saber-toothed cats, and giant ground sloths, animals contemporary with those that lived and died at Rancho La Brea—left their tracks around what was probably a temporary watering hole.

In the fall of 1862, in Nevada and California, the people got to running wild about extraordinary petrifications and other natural marvels. One could scarcely pick up a paper without finding in it one or two glorified discoveries of this kind. This mania was becoming a little ridiculous. I was a bran-new local editor in Virginia City, and I felt called upon to destroy this growing evil.... I chose to kill the petrification mania with a delicate, a very delicate satire. But maybe it was altogether too delicate, for nobody ever perceived the satire part of it at all.

Within this free-wheeling atmosphere of the Old West, then, the time was certainly ripe for an authentic scientific finding. Charles Darwin's 1859 treatise *Origin of Species* and his *Descent of Man*, which appeared in 1871, had laid considerable groundwork for the anticipation of human ancestors in the fossil record. Thus, when large, seemingly bipedal trackways were found in association with those of extinct mammals, certain scientists of the day were quick to pronounce these footprints as having been made by a primitive race of human inhabitants. This move soon created a flurry of public excitement and promoted numerous debates among scientific associations and their members. Some of the nation's most respected paleontologists were sought after for their opinions, which, by and large, they freely expressed. These views were likewise satirized, and the whole controversy was not settled (from lack of available evidence) until nearly forty years later. These events, however, formed one of the most interesting, yet least known, chapters in the history of American paleontology and rightly deserve greater recognition than they have so far achieved.

Situated one and one-half miles east of Carson City, and three miles from the base of the Sierra Nevada Mountains, is the Nevada State Prison, established in the 1870s. It rests at the extreme northernmost point of a low hill upon an outcrop of sandstone that gently dips two or three degrees to the west and the elevation of which reaches nearly 4,800 feet. The rock making up this formation was once quarried for building stone by the prisoners to a depth of about thirty feet. University of California Professor Joseph LeConte, in an 1882 paper, described the uppermost rock unit as consisting of "heavy bedded grayish and creamy sandstones, separated by thin layers of shale. The sandstones in many places...are strongly affected with cross lamination, indicating deposit by rapid, shifting, overloaded currents." Lying unconformably below this layer was a finer-

grained sandstone, "uniform and much more compact, and having no current-bedded structures." This layer rested upon two fossil footprint horizons made in shale, uncovered by the quarrying efforts of the prison's inmates.

During the quarrying operations, strata from the upper divisions were found to contain the fossilized impressions of woody vegetation, pine cones, freshwater shells, and occasionally the bones or teeth of large vertebrates. The early history of this formation was reconstructed by W. P. Blake in *Science* (September 19, 1884) not long after the footprints were found:

The floor of the quarry marks the close of a period of strong currents of water, depositing sand. A period of quiescence ensued, with the deposition of a fine clay or silt. This was drained of water, and became firm enough for animals to walk upon it and leave their tracks. This layer is separated from a second clayey layer by about eighteen inches of sand, marking an overflow and a second period of quiescence and drying up.

It is probable that these deposits were formed near the mouth of a comparatively large stream, subject to floods, and flowing into a shallow lake. Such conditions are not unlike those we now find all along the eastern base of the Sierra Nevada, where mountain torrents pour out into elevated valleys without outlet, and form broad lakes, which vary greatly in their extent at different seasons of the year.... This need of water may account for the number of animals which crowded together at this place.

From the evidence of the footprints, and the other plant and animal specimens collected from these beds, geologists long ago settled upon the Pleistocene or Ice Age epoch, perhaps some fifty thousand years ago, as the probable age of the deposits.

Word apparently did not reach the scientific community of the remarkable tracks then being uncovered on the prison floor until June 1882. On a visit to the California Academy of Sciences in San Francisco, W. J. Hanks, Sheriff of Storey County, Nevada, first conveyed news of the discovery to the Curator of the Geological Museum, Charles Drayton Gibbes. After being furnished with additional information following Sheriff Hanks's return, Mr. Gibbes, Dr. Harvey W. Harkness, Professor Joseph LeConte, and a party of investigators from the academy visited the quarry on July 20. They were received by the prison's warden, Major William Garrard, who subsequently did everything in his power to assist them in their work. The

spectacular sight that first met their eyes was later described by Harkness in a paper read two weeks later before the California Academy of Sciences:

Presumably we stand on the shore of this ancient pond or lake, and as we look about us we see the footprints of a variety of animals, among which we recognize those of the mammoth, the deer, the wolf, of many birds, of a horse, and most important of all, the imprints of the sandaled foot of man.

The largest and most distinctive footprints unearthed certainly belonged to those of a mammoth, probably the Columbian Mammoth (*Mammuthus columbi*). These prints measured on average twenty-two inches in diameter and as much as five inches deep. Soft mud upon which the animal originally walked was squeezed into a low rim around the foot, while the creature's weight was sufficient to depress the sandy layer below. The mammoth left only faint toe or footpad markings within the tracks.

As the animal walked, its hind feet fell almost exactly over the prints made by the fore feet, which gave the false appearance of a bipedal trackway. Between successive prints on either the left- or right-hand side was an average spacing of nine feet, which implies that this quadruped's stride was half that value or four and a half feet. The straddle, or distance measured between parallel lines drawn through successive left and right prints, was approximately nineteen inches. The quarrying operations also uncovered fragmented teeth and tusks of these magnificent pachyderms (most, however, were so poorly preserved that they could not be recovered) and even the faint imprint where one mastodont had laid down.

Besides the mammoths' clear footprints, there were also a great profusion of smaller tracks. Some were undoubtedly made by large birds with widely spread toes. These footprints reached a length of five inches or more, while the stride varied from twelve to twenty inches. Their size was compared by Joseph LeConte to modern tracks made by the Great Blue Heron (*Ardea herodias*) or Whooping Crane (*Grus americana*). Other prints could have been made by a large Pleistocene vulture akin to *Teratornis*.

Still more tracks, approximately five inches in diameter, were thought to have been made by a large feline (possibly the saber-toothed cat *Smilodon*); those roughly four inches across by a large dog or wolf (perhaps the Dire Wolf, *Canis dirus*, known from Rancho La Brea); and still others doubtlessly implanted by the feet of deer (*Odocoileus*) or buffalo (*Bi-*

UPPER FLOOR.



Mammoth tracks.



Footprints series No. 1.

LOWER FLOOR.



South west corner, prison yard.



Bluff at guardhouse No. 5, south wall.

Contemporary engravings of the footprints and excavations within the courtyard of the Nevada State Prison, 1882.

son). Last, numerous footprints and the scattered teeth and jaws of an extinct horse (*Equus*) were found within the formation.

Without question, however, the most exciting tracks awaiting scientific study were the problematical "human" footprints first described by Harkness in 1882. These measured nineteen inches long, eight inches wide at the front of the foot, and six inches across at the heel. The stride varied between two and one-half and three feet, while the straddle was regularly eighteen or nineteen inches wide. No distinct signs of toe or claw marks could be noted on any of these tracks.

Because the tracks gave every appearance of having been made by a biped, Gibbes and Harkness put forth their "sandalized human foot" hypothesis. Plainly, the footprints were too large for a bare-footed walker to have made. So Harkness and Gibbes suggested instead that large wooden sandals had been worn on the undersides of the feet—a suggestion that came in part from Major Garrard of the prison, who first supposed that the actual foot had been "moccasinized."

Several other characteristics of the trackway also suggested that the footprints were made by sandaled feet. One was the amount of curvature of the prints. Although the prints exhibited a greater degree of this trait than human feet actually do, the sandals, of course, might have been shaped in any way. Nor were the outward turn of the feet, relative to the direction of motion, and the stride (about that of a six-foot human) inadmissible features. The only character of the tracks that proved fatal to the bipedal theory was a straddle, which, as Joseph Le Conte succinctly pointed out, was "as great as that of the contemporaneous elephant." These footprints, he argued, could only have been made by a large quadruped, perhaps a bear or "the extinct gigantic ground sloth, the *Mylodont*—perhaps more likely the latter." As for the absence of toe or claw marks, these he attributed to "the clogging of the feet with mud."

Here, then, was a remarkably perceptive and bold hypothesis; one that immediately fell at odds with the prevailing opinion favoring a human origin for the tracks. Furthermore, it was made without recourse to any osseous (bony) remains for support. But despite this ingenious reasoning, Le Conte's ideas were not easily accepted, at least, not at first. When news of the remarkable findings and the prevailing interpretation traveled widely, it electrified the popular and scientific presses of the day.

The next official announcement following the California Academy reports was that given in January 1883 by Edward

Drinker Cope in the *American Naturalist*. His summary echoed the theory of Harkness and Gibbes that the footprints were made by "the ancestor of existing man." Similar views were published abroad, although unofficially, by the Duke of Argyll in a joint communication to the British journal *Nature*. Argyll wasted few words in adding to the controversy, stating, "Nevertheless, it is, if confirmed, a highly remarkable discovery, especially as connected with the curious intimation so concisely made in the Jewish scriptures."

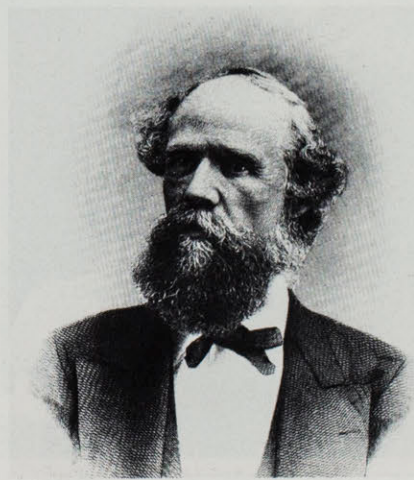
The following month *Nature* printed an informative letter from Joseph Le Conte, who emphasized the objections to the human sandaled foot theory of Harkness, Gibbes, Cope, and associates. While pointing out the objections to his interpretation, he nonetheless stood by his quadrupedal explanation: "This view seems to me most probable, but many who have seen the tracks think them human, and I freely admit that there is abundant room for honest differences of opinion."

The eminent Professor Othniel C. Marsh, who had debunked the Cardiff Giant in the early 1870s, did not remain quiet on the subject. After reading Harkness's and Le Conte's papers, he quickly sided with the latter's quadrupedal theory. Furthermore, he compared diagrams of the footprints published by Harkness to the foot reconstruction of the extinct sloth *Mylodont robustus* drawn by the English comparative anatomist Richard Owen. Finding nearly perfect agreement, Marsh expressed his opinion that "the supposed tracks were made by large Edentates [the order of mammals to which sloths belong]." In addition, he cited "the important fact...recently determined, that some of these tracks show impressions of the forefeet...somewhat outside of the large footprints." It appeared scientifically, at least, that the human (bipedal) theory was dead. By late 1883, even Marsh's fierce rival Cope seems to have conceded the argument, though not without continuing to question the absence of claw marks. It would, perhaps, be one of the last issues in their careers upon which these two men could agree.

Probably the most comprehensive summary of knowledge regarding the tracks through that time appeared in 1884 in the newly formed journal *Science*. Author W. P. Blake called the sloth trackways the most important discovery "since the unearthing of the fossil [dinosaur] footprints in the sandstones of the Connecticut Valley." Furthermore, he stated, "the opinion of Professor Marsh, that these tracks were formed by one of the edentates, is best in accord with the phenomena, and appears the most reasonable when we give due



*Above: Reconstruction of Harlan's ground sloth (*Mylodon harlani*) from material found at Rancho La Brea. This was the animal responsible for making the controversial footprints.*



Left: University of California Professor Joseph Le Conte, who in 1882 correctly identified the footprints that were thought to be human as those of a giant ground sloth.



Left: In 1917 paleontologist Chester Stock established the validity of Professor Le Conte's ground sloth footprint hypothesis by drawing comparisons to fossil material found at Rancho La Brea. Dr. Stock is seen here measuring a dire wolf cranium.



*Fossil footprints of the giant ground sloth *Mylodon* exposed at the Nevada State Prison, Carson City, and mistaken for human footprints. The footprints no longer exist, having been obliterated by recent construction at the prison. Photograph courtesy of the MacKay School of Mines, University of Nevada, Reno.*

weight to the fact that some of these animals are believed to have walked partly upon the side of the foot and leg, thus carrying their great claws in such a way that they left no imprint." Although Blake's scientific descriptions and conclusions left little to be decided on the matter, when a definitive map of the locality was produced in 1889 by the Indiana geologist Addison Coffin, those tracks believed to have been formed by the sloth were nonetheless labeled "Giant Man." Clearly, the emotionalism the tracks evoked had not entirely disappeared. The existing generation of scientists, including Marsh, Cope, Le Conte, and others, would pass completely away, however, before the next scientific papers on the footprints would be published in the twentieth century.

The next individual who devoted considerable attention to the Carson Footprints, and who ultimately established the validity of Le Conte's early hypothesis, was the California paleontologist Chester Stock. Considerably aiding his interpretation of the prison material was the concurrent excavation and description of tremendous numbers of mammalian fossils from the Pleistocene-age Rancho La Brea asphalt deposits of Los Angeles. From this wealth of evidence has come a fairly complete knowledge of that fauna, which was approximately contemporary with the Nevada track-makers. Stock, writing in 1917, once again examined the question of the footprints and particularly addressed the objections raised against the absence of claw marks. "From the present reconstruction of the pes [hind foot] of *Myloodon*, it is seen that the third digit did not bear a large claw as supposed by Owen. It follows that the possibility of obtaining a distinct impression of this claw is therefore also reduced. A comparison between the pes of *Myloodon harlani* from Rancho La Brea and the debatable footprints at Carson City reveals a remarkable similarity in size and general outline. This evidence is then in strong confirmation of the view expressed by Le Conte and Marsh."

Two years later, Stock "was enabled to examine a number of specimens of fossil mammals collected in the prison yard during past quarrying operations for building stone. In the material preserved in the collections were fragments of a skull and a cervical vertebra belonging to the ground sloth.... Further study indicates that the... specimens pertain to an individual of the genus *Myloodon*.... The actual occurrence of osseous remains of *Myloodon* in the Pleistocene deposits at Carson City, Nevada, removes still farther the possibility that the Carson footprints are to be attributed to the

Hominidae, and materially substantiates the suggestions of Le Conte and Marsh." Thus, the long-standing mystery and controversy of the enigmatic tracks had at last been solved.

As late as 1936, clearly defined footprints of the mammoth and sloth were still preserved for casual inspection in two tunnels in the east wall of the prison yard and in front of the prison's west wall. More recent construction at the prison, however, has either covered or obliterated all remaining traces. During the author's visit to the prison grounds in 1982, only the upper ten to twenty feet of original rock walls surrounding the courtyard were still visible. Everything that had existed below this layer, including the footprints, is now covered by many feet of topsoil or the foundations of new buildings.

There are few artifacts and specimens left as reminders of the remarkable array of fossils and footprints that were exposed one hundred years ago. The Nevada State Museum in Carson City houses exhibits on the sloth and mammoth; it also retains some actual tracks of birds, a fiberglass replica of two mammoth tracks, miscellaneous fossils, and a reprinted copy of the Addison Coffin chart. At the Mackay School of Mines Museum on the University of Nevada, Reno, campus, visitors may examine two genuine tracks of the sloth and those of a horse, along with displays of other contemporary Pleistocene fossils. The University of California Museum of Paleontology in Berkeley has a plaster cast of the sloth tracks, from which the casts of the tracks in the possession of the Natural History Museum of Los Angeles County were taken in the early 1920s by Jack Lyle, the Natural History Museum's preparator. Finally, the California Academy of Sciences in San Francisco still holds a few freshwater fossils collected during the first visit of Harkness, Gibbes, and Le Conte; the rest of their material was presumably destroyed in the 1906 earthquake.

Jordan Marché is director of the North Museum Planetarium, Franklin and Marshall College, Lancaster, Pennsylvania. He was previously program specialist at the Fleischmann Planetarium in Reno, Nevada, where he developed his interest in the fossil trackways at Nevada State Prison. Besides pursuing interests in telescope making and paleontology, Mr. Marché is researching a biography of the nineteenth-century geologist Edward Hitchcock, who pioneered the study of fossil footprints (ichnology) with his discovery of dinosaur tracks in Massachusetts and Connecticut.



Mark Twain penned satires of petrified men and advanced his own theory about the fossil footprints: "I know the cold facts about the footprints," said Twain, "they were made by the first Nevada Territorial Legislature, and I was there when it was done." Courtesy of the Seaver Center for Western History Research.



R. M. Daggett, alias the Cave Bear in Mark Twain's satirical piece. Daggett was a journalist, and he was Twain's colleague on the Territorial Enterprise in the 1860s. Photograph courtesy of the Nevada Historical Society.

Illustrations on page 17: Outlines (reduced from the originals, which were eighteen inches long and which were reproduced full size in the Proceedings of the California Academy of Science), of the left and right hind footprints of the sloth *Myloodon*, about which the "sandal human foot" hypothesis was erroneously formed.

It may be all very well for Professor Marsh and Professor Harkness to talk their scientific talk about the Carson Footprints, and try to saddle them onto the Primeval Man, the Irish Elk, and others who are gone and cannot now defend themselves; it may be all very well, I say, and entertaining, and within the just limits of scientific slander and research, but it is not *moral*. For I know the cold facts about the footprints, and I know they were not made by the Primeval Man, or the Irish Elk, or any of that sect; they were made by the first Nevada Territorial Legislature, and I was there when it was done. It was done at the time of the *sine die* adjournment. It had rained rain all the evening outside, and it had rained whiskey all the evening inside—inside the fence, I mean, for there were no buildings in that early day—and neither you nor a much older man could have told on which side of the fence the weather was the most inclement. I was on both sides of it, and sometimes on it, for a brief uncertain season, and I couldn't tell. The Footprint quarry, where that legislature sat—stood, while they could, I mean—was a dry alkali flat, with a fence around it, when the rain began: just a

dry alkali flat, containing a fence-full of dry, honorable alkali flats from all over the Territory; and in three hours that first mentioned flat was absolutely soaked, to a depth of three inches; and the others all the way through. I make no exceptions; I say all. I was there, and I know. So the place has become a regular marsh, full of irregular marshes, so to speak—meaning the legislature. Meaning the legislature, but intending no disrespect. And when the weather moderated so that one could venture outside—outside the fence—these latter adjourned. They adjourned, in the usual form—form used by territorial legislatures of that day—the Speaker bringing down his gavel on the head of the member mistaken by these scientists for the Irish Elk—which he, the Speaker, mistook for a fence-post—and thus, as you see, is the gloom and sorrow of a double error spread over this moldering historic incident—and said—common time, four beats to the measure, that is to say four hiccoughs to the sentence: “the modder having weatherated,” and so on, in a similar strain, till he got through. I remember it as if it were but yesterday. Thus dissolved, they departed thence.

It was then that they made the tracks. They couldn't help making them; for the place was a marsh, as I was telling you. I saw it done, for I was there. I was there, and I shall now cast upon this pale dim void of scientific conjecture, the lurid glare of history. I was there, and I saw them march. The Primeval Man was absent; the Irish Elk did not arrive; the Cave Bear responded not to the summons; the Old Silurian Ass got left. The menagerie was wholly local. Part of it I saw, and the rest of it I was. This is history; this is cold history; and history cannot lie.

The Speaker went first. He made the large tracks—the ones that are eight inches broad and eighteen inches long, and resemble the footprint of a champagne basket. He was a prime man in two or three ways, and evil in forty; but he was not the Primeval Man, just the same: reflect upon this. I was there; I was there all the time; and I knew him well. He made the large tracks. And he did it without an effort. He could have done it with one hand tied behind him. He said so himself; he didn't tell me so, but he told

others so, though I knew him well. His name was Welsh; either Welsh or Sanders. I don't remember which, but it was a name that sounded like those. He was a rancher: kept a ranch; cattle ranch; and did not wear shoes, such not being his custom, though a praying man from his mother's knee. And always when he went forth ranching with all his might into the pasture amongst the cattle, there was much hay and straw lying scattered about, and with it much other material—material of a plastic nature; mud, to-wit; acres of it; and this material and the straw did of a truth and by custom combine and form unto him uncreated sandals, as you may say—uncreated, because not projected by volition nor wrought by art—nay they were but the cumulative achievement of time—that is to say, time and patient neglect. And as the prosperous years rolled on, his sandals waxed, and gathered grace and style, and also magnitude and majesty; insomuch that the footprint of him was like to the footprint of a hogshead which is up-ended in the snow. And he became a legislator, and also Speaker. But there was jealousy because of the splendor of his attainments in the field, there was rancor because of the sublimity of his sandals. And

besides, there was not room; for the alkali flat was circumscribed in area, and he unjustly occupied space proper and sufficient for the representation of several counties; also, he trod upon the feet of distant members. Those near at hand could see the danger, and avoid it; but those who were further removed, having no warning, his step being noiseless, like to that of the stealthy and cushioned cat, suffered. Yet his intentions were pure, he did these things inadvertently—usually while absorbed in thought concerning the national debt.

So, charges were brought against him, and he was indicted, tried, and condemned, as an obstructionist. The verdict was confirmed by the appellate courts in succession, by Congress also, and finally by the United States Supreme Court, sitting in bank, or chambers, or somewhere, and this latter condemned him to cut his sandals down to eight inches broad and

eighteen inches long, with costs; and thus it was with these reduced powers, these diminished capacities, that he made the now world-renowned Footprints for the Primeval Man. But suppose he had had a chance to do some fossil tracks for the benefit of science before they trimmed his golden slippers? Which one of the late lamented would they have laid *them* on? But that is not vital to my theme—they'd have found a fossil to fit them, I judge.

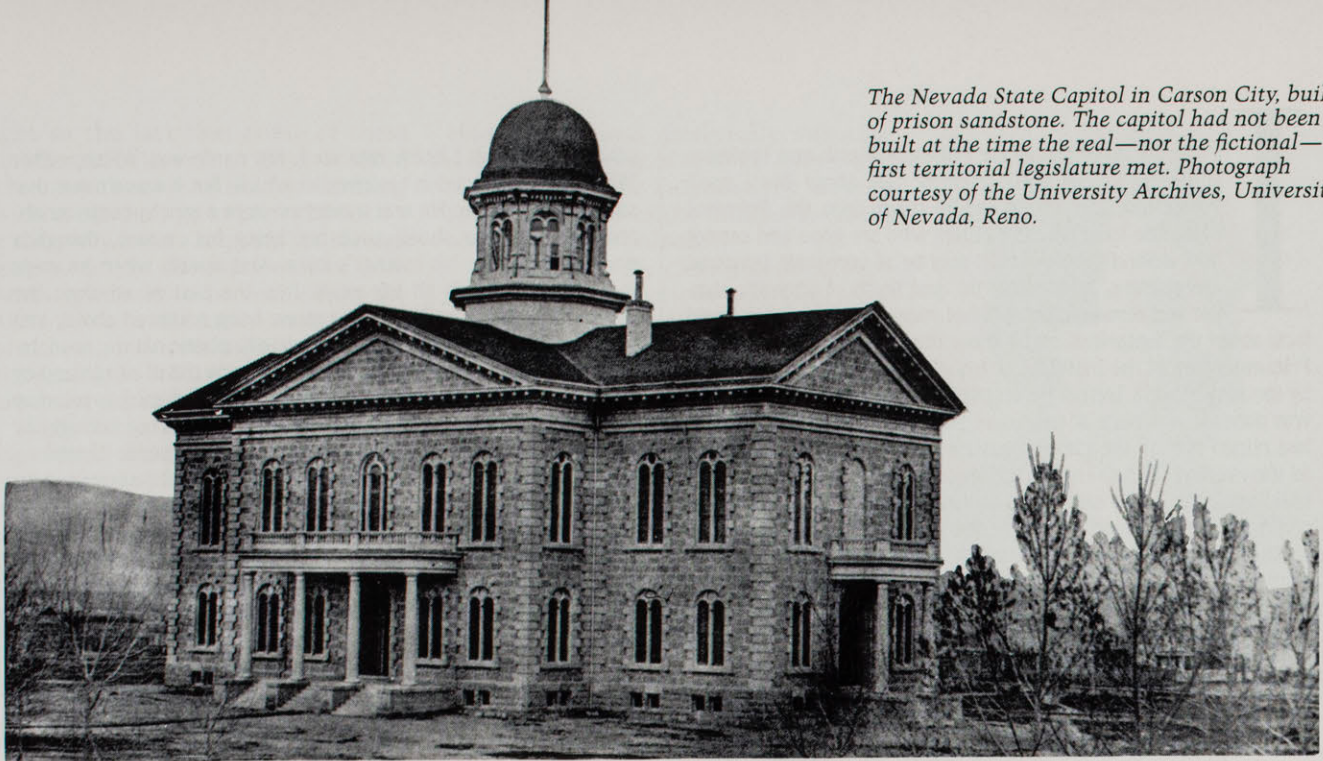
Such is history; and thus is the Primeval Man vindicated, struck from the roster, and dismissed from further service in this conflict. I now proceed to dispose of the rest of those myths. If I were gone, and the treasury of history with me, they yet could not stand; for even the scientific theory that gave them being would be also their destruction. Because it locates them back in the Old Red Sandstone Period. There were no Irish in the Old Red Sandstone Period. The Irish are a comparatively recent formation. They belong in the Old Blue Grindstone Tertiary, and are there confined to the stratified rocks of the post-pliocene alluvium and upper pentamerous limestone. The assertion of Hugh Miller and other early observers, that traces of them are discoverable in the Jurassic deposits of the Carboniferous Chalks, between the median layer of old basaltic gneiss and the marsupial crinoids of the Paleozoic

From the *San Franciscan*,
vol. 1, no. 1, February 16, 1884

The Carson Fossil Footprints

by Mark Twain





The Nevada State Capitol in Carson City, built of prison sandstone. The capitol had not been built at the time the real—nor the fictional—first territorial legislature met. Photograph courtesy of the University Archives, University of Nevada, Reno.

Conglomerate, was regarded with suspicion at the time, and is now known to have been wholly bituminous. Now then, we come to the point. If these footprints belong to the Old Red Sandstone Period, what becomes of your Irish Elk? What was he doing there, when there weren't any Irish yet? Answer me that. Crack me that nut, Messieurs Marsh and Harkness—and pray let us have no scientific folderol about it. Let us have a square deal just this once. The case is simple: I see your geological blunder, and go you a geological *fact* better—now you call me, if you can. Then we'll draw three apiece and double the pot. I think nobody can offer fairer than that.

And so I have disposed of the Irish Elk—as I look at it. Now we come to the Cave Bear. What is his period? He belongs among the talcose hornblendes of the Post-Tertiary Devonian, along with the thecodont saurians, cryptogamous batrachians, and other gold-bearing rocks of the Azoic age; and there isn't a trace of him to be found anywhere else for money. Then what is he doing out there among the Old Red Sandstone schist? Why, honored sirs, when he died out of the world for good and all, there wasn't enough Old Red Sandstone in it to make a whetstone out of. It hadn't begun to deposit, yet. And another thing: the Cave Bear couldn't have lived in Nevada, anyway, for there isn't a cave in it, from one end of it to the other—except the comparatively recent ones in the mines, and perhaps here and there in the mining stocks. Too recent to do *him* any good, or hardly anybody else.

This disposes of the Cave Bear, as I look at it. Now the same arguments that dispose of the Irish Elk and the Cave Bear, dispose also of the Old Silurian Ass; for they trained together. They were of the same general breed of mammals, and were the only mollusks that were able to hold their own against the Megatherium, the Ichthyosaurus, and other flesh-eating birds of the birdo-reptilian period, and did it then only through that vigilance which is the price of liberty, and that union in which is strength. All honor to the brave!

Now then—enough of that. Let conjecture stand aside, and history go to the bat. For I was there myself, and I know. The tracks which have been attributed to the Irish Elk were not made by an Irish Elk at all; they were made by an Irish bricklayer—named Stephen McGinniss. Member of the legislature. I knew him perfectly well. He had a hoof; hoof like a cow's. It was a birthmark. He was a high tempered man, and very handy with his birthmark. And is even now at this minute after the scientists—and they will see. Even the elect may not call Stephen McGinniss an Irish Elk with impunity, nor misinterpret his hoofprints in a spirit of scientific wantonness. These are truths, these are facts; in a word,

history. For I was there.

Little remains to be said. Only this: the Cave Bear tracks were made by Mr. R. M. Daggett, now grown honorably famous in other walks of life, but still depositing the same identical track to this day, let us freely believe, when he goeth unshod—as was the sternly simple custom of the pioneer legislator of the Territory of Nevada, in a day when virtuous endeavor was held above the comfort of the body, and godliness above meretricious gauds of fashion.

The tracks attributed to the Old Silurian Ass, were not made by the Old Silurian Ass. I made them myself. I made them myself, and I am not an Old Silurian Ass. I may be some kind of an ass, and some observers have held the theory that I was and am; but I am not an Old Silurian Ass. I made those tracks; and I make the same track now; and it appears that even an expert cannot tell it from an Old Silurian Ass's track, and neither can I, for that matter; but it is not an Old Silurian Ass's track, just the same, any more than I am an Old Silurian Ass; yet the person who calls the track out yonder an Old Silurian Ass's track, does in effect call me an Old Silurian Ass, by reason that I made that track. And it must not be repeated. For I have my feelings, as well as another; and the man that calls me an Old Silurian Ass, and proves it, shall not go out of this world alive. I have said it. The language may be intemperate, but the provocation is great.

These scientists are in an ill-concealed sweat because they cannot tell *why* there are so many tracks, and all going one way, all going north. It was a large legislature, dear sirs: and the saloon was north. This is history, not conjecture. For I was there—in person.

And they cannot divine why the Primeval Man took such short steps, yet with so little lateral spread. Think of the feet he carried; also, remember his condition; of course a person could not spread laterally, in his condition, as deftly as he could formerly, when sober; necessarily he would spread laterally, formerly, but not laterally, the conditions being reversed, you see. This seems simple. Also unanswerable.

And they are perturbed because they cannot tell why the tracks are so confused, and move in such subtly sinuous curves. Listen, then; I will explain this also. It is a law of nature that whiskey cannot be conveyed in straight lines by a legislature, except in buckets. A legislature never uses buckets, man.

I am done.

Such is history. Such are the Carson Footprints. They are not fossiliferous—they are legislative; they are uniform, they are identical with the tracks deposited by all adjourning legislatures. In the West, I mean. Let us have peace!

THE EL SEGUNDO BLUE BUTTERFLY: SURVIVING IN LOS ANGELES

by JOEL GROSSMAN



An El Segundo Blue butterfly rests on a sea cliff buckwheat blossom. The butterfly, one of the smallest creatures on the U.S. Endangered Species List, lives its life in close association with this also-rare plant. Photograph by Jim Zuckerman.

The late novelist Vladimir Nabokov, whose avocation was the study of butterflies and moths, was so fascinated by the Blue butterflies while a research fellow at Harvard University's Museum of Comparative Zoology in the 1940s that he said, "The thrill of gaining information about certain structural mysteries of these Blue butterflies is perhaps more pleasurable than any literary achievement."

The El Segundo Blue butterfly, which is about the size of a dime and is one of the smallest creatures on the U.S. Endangered Species List, once fluttered and played on the thirty-six square miles of Los Angeles County's El Segundo Dunes. These sandy ridges used to stretch along the shore of Santa Monica Bay from Playa del Rey to the Palos Verdes Peninsula. All that is left of these sand dunes, which nonetheless make up the most extensive dune system between the Mexican border and the San Luis Obispo County line, are two small remnants harboring the last remaining populations of the El Segundo Blue butterfly in the world. Sandwiched between the runways of Los Angeles International Airport (LAX) and Dockweiler State Beach lie 302 acres of the dunes. The other remaining piece of the dune system is a tiny two-acre parcel located within the confines of Chevron USA Inc.'s El Segundo refinery.

Even though the El Segundo Blue is tiny, its diminutive size is nevertheless an important indicator of the health of its habitat. When an animal the size of a butterfly is threatened with extinction, the whole habitat, with all its plant and animal communities, is on the verge of disappearing. One of the plants that is vanishing quickly from the dunes is the native sea cliff buckwheat, which is the butterfly's sole food source.

The situation is so acute, since the El Segundo Blue faces extinction by starvation if its food plant disappears, that extraordinary measures have been taken to preserve the buckwheat population at Chevron's El Segundo refinery. Refinery employees put up a six-foot-high chain-link fence topped with barbed wire to keep vandals from hauling away the dune sand, but the fence could not keep out an invasion by aggressive tumbleweeds, rye grass, and ice plant, which had choked out many of the native dune plants. Nor could the native sea cliff buckwheat get the wind-blown sand it needed for its seedlings to survive. Dr. Richard A. Arnold, a research associate of the Natural History Museum of Los Angeles County, proposed a program of active intervention that he believed was the only hope for the butterfly population at the Chevron El Segundo refinery; with Chevron's cooperation, his program was implemented.

Removing the nonnative weedy plants to allow room for the buckwheat to grow was the first step. A go-slow approach was taken because some of the weeds, such as the ice plant, prevent wind ero-

sion and help stabilize the dunes. The program also had to proceed slowly because it is suspected that ice plant may secrete a natural herbicide that is toxic to other plants. After removing a patch of ice plant, the ground must be left fallow for a year to allow this chemical to leach out of the sandy soil. Once this was done it was possible to transplant nursery-grown buckwheat seedlings on the Chevron dunes, and six hundred sea cliff buckwheat plants have been planted each year in cooperation with the U.S. Fish and Wildlife Service, the official guardian of the endangered butterfly.

Buckwheat seedlings transplanted to the dunes are now two and three years old. It is usually in this second year of growth that the plants first begin producing flowers. Adult El Segundo Blue butterflies sip nectar from these blossoms during their ephemeral two- to three-day life spans. The buckwheat plants, which may live for more than a decade, become bushier and nourish more butterflies with each passing year.

Not only do the butterflies feed off the plant, but their lives center on it. When the male and female butterflies find one another perched on the buckwheat, the male flutters its wings, touching the female and nudging her with his abdomen. The receptive female will then briefly flutter her wings. A nuptial dance follows on the buckwheat flowerheads with mutual wing fluttering, nudging, and twirling taking place for several minutes before the butterflies mate over the next one to two hours. The female El Segundo Blue lays her eggs on the plant; when the eggs hatch, the caterpillars munch on the buckwheat flowers for

about a month before dropping into the sand at the base of the plant each autumn. The caterpillars remain here in an intermediate state before pupating (although a few caterpillars remain in the flower heads to pupate) and re-emerging in the spring as butterflies.

Buckwheat plants normally must be from seven to ten years of age before they can produce enough flowers to satisfy the appetite of the El Segundo Blue butterfly. The scraggly two- and three-year-old transplants at the Chevron refinery had to be clustered to simulate the abundance of the older plants. This clustering strategy proved successful; nearly as many butterflies were counted around the transplant clusters as around older, bushier plants at the LAX site.

There are 343 of the older, bushy buckwheat plants scattered over 80 acres of the 302-acre dune remnant at LAX. (If the LAX dune area containing the sea cliff buckwheat were divided into football fields, there would be the equivalent of one plant per field.) These plants are failing to reseed themselves, so a possible calamity awaits the butterflies associated with them, since El Segundo Blues rarely roam more than a few hundred feet from their birthplace.

The LAX dunes have been swirling in controversy since the 1960s, before anyone was concerned about the El Segundo Blue butterfly. Once known as the Playa del Rey sand dunes, the LAX dunes were home to about four thousand Los Angeles residents. The houses covering the dunes were condemned and removed in the late 1960s and early 1970s because of noise complaints about the airport and lawsuits from some of the homeowners. Today, the area where the houses used to be resembles a ghost town. Looking down and to the west on a plane take off from LAX, you can see palm trees, streets, and sidewalks surrounding the now-vacant lots. If you could look more closely you would see that the concrete has begun to deteriorate as a result of natural weathering processes, and native plants are recolonizing the area. The Playa del Rey "ghost town," unlike most others, was very expensive to create: \$60 million, 75 percent from the federal government, was spent to remove the homes. "The airport acquired the property for safety and noise reasons," said Michael Feldman, a city planning associate with the City of Los Angeles Department of Airports. "There was a plebiscite in which 60 percent of the homeowners voted to be bought out and

40 percent against this. There was lots of emotion and controversy. Many became professional airport haters and said we were buying property for hotels and intensive use. There is also opposition from local people who don't want us to do anything with the property now that we have acquired it.

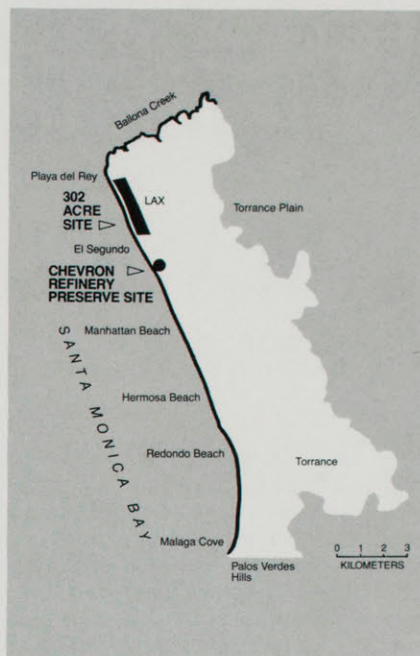
"There is noise, traffic, and a high social cost of being around an airport," continued Feldman. "We want to put something back. Golf courses are approved uses for airport buffer areas. We have petitions from ten thousand golfers who want it. Noise is not a major issue with golfers."

The airport plan for the El Segundo Dune remnant is to make one-third of the land a preserve and devote the other two-thirds of the land to golf. Eighty acres on which the butterfly already exists would be set aside as a dunes conservancy, and an additional twelve acres would be added as a buffer zone between the endangered El Segundo Blue and recreational users of the land.

The airport considers the other 220 acres to be highly disturbed from the home sites previously occupying the area and too costly to develop as a butterfly conservancy. Twenty-five of these acres would be devoted to active recreational pursuits ranging from tennis and racquetball to a golf driving range and clubhouse. The airport proposes to set aside five acres at a prominent point as a view park overlooking the airport, Palos Verdes, Malibu, and Catalina Island, with parking, picnic tables, and gazebos provided. The rest of the 178 acres would be devoted to golf, with three 9-hole championship courses that would be operated by a private concessionaire.

According to the airport plan, the private developer would develop the land for golf and establish the conservancy under a lease arrangement with the airport. About two hundred thousand games of golf per year would be played on the dunes, according to airport estimates. Land-lease revenues would flow from the developer to the airport.

Feldman calls this an equitable, multi-use solution. "Basically, no one has any funds to do what we promise," says Feldman. "The airport is a profit-making enterprise, and the Board of Airport Commissioners' charter is to use money to generate revenues. There is no mandate to perpetuate the butterfly." Though it would conflict with the present charter, Feldman hopes that some money from a golf course could somehow be diverted to maintenance of the habitat of the



The area formerly covered by the El Segundo Dunes.

endangered El Segundo Blue butterfly.

Opponents of the plan are crying foul rather than fore, pointing out that the El Segundo Blue's future is still not guaranteed under a city charter that mandates use of the land to generate revenues. The Dunes Committee of the Ecology Center of Southern California proposes that the entire dune remnant be restored to recapture a vanished part of the southern California ecological heritage. If the Dunes Committee were advocating restoration of an Old Master mural or an example of historic architecture, then it would be facing better odds than it now faces in seeking protection and restoration of the last 1 percent of southern California coastal sand dunes.

Dr. Arnold points to the dune restoration effort at Chevron's El Segundo refinery as an example of the kind of work that is needed to preserve endangered habitats. "It's a long-term project, but we're headed in the right direction," says Dr. Arnold in reference to the Chevron project. "Stabilizing the buckwheat can lead to efforts to re-establish other elements of the natural biological community adapted for sand dune life."

A complex food web, of which the El Segundo Blue is but one component, characterizes the ecology of a pre-urban sand dune. The butterflies themselves may be preyed upon by ground beetles, tiger beetles, spiders, and other small creatures that are in turn preyed upon by larger creatures such as frogs, toads, mice, shrews, song birds, and owls. Among the now-rare organisms once common to the El Segundo dunes are the parasitic scaly-stemmed sand plant, legless lizard, coast horned lizard,

coastal little pocket mouse, broad-footed shrew, Belding's savannah sparrow, American peregrine falcon, and El Segundo sand dune snout beetle.

During the El Segundo Blue's mid-July to late-August flight period, Dr. Arnold pursues his study of the butterfly seven days a week. Most of the information Dr. Arnold gathers on the El Segundo Blue and the dune plant life is used to construct computer simulations of the fragile dune environment. These models can be used to test what the effects of actions such as removing ice plant and planting buckwheat will be without actually jeopardizing the endangered butterflies or the fragile dune environment. In the future, these models may aid other endangered species struggling for survival.

Because the butterflies are thriving at the Chevron refinery, Dr. Arnold will not face the discouragement he had last spring when he could find no specimens of the Palos Verdes Blue, a relative of the El Segundo Blue butterfly. The Palos Verdes Blue fell victim to loss of its food plant as its habitat was mowed, disced under, and developed into baseball fields and hillside homes. This kind of habitat loss has become a worldwide problem as species disappear from the planet forever. Preservation of the El Segundo Blue butterfly is part of the preservation of southern California's ecological heritage. Losing any of the sites inhabited by the endangered butterfly could trigger a domino effect in which species after species in the food web become extinct.

"The science of conservation is not exact," says Dr. Arnold, "so we need all the sites we can get. Having only one site is like putting all your eggs in one basket. As the area inhabited by the butterfly gets smaller and smaller, the chances of a catastrophe wiping out the species becomes greater and greater."

The California Coastal Commission strongly rejected the LAX golf course plan by a vote of 8 to 4 on 21 November 1985. The commission was especially critical of LAX for allowing the habitat to deteriorate, even in the area proposed as a butterfly preserve, and for failing to conduct a thorough biological survey not only of the controversial El Segundo Blue butterfly but other rare dune inhabitants such as Lange's dune weevil, Lora Aborn's moth, and Ford's dune moth before making land use decisions.

Joel Grossman is a local freelance writer.

The Glory of Ancient Syria

EBLA TO DAMASCUS, PART II

by GIORGIO BUCCELLATI and
MARILYN KELLY-BUCCELLATI

As a result of recent excavations, Syria has come to the center of attention as the site of pivotal ancient urban civilizations, contemporaneous with and as significant as those of southern Mesopotamia and Egypt.

Our survey of Syrian antiquity began with the late prehistoric cultures that provide the immediate antecedents of early city life. We then turned our gaze to Ebla, one of the great urban cultures of the third millennium B.C., which was excavated beginning in the 1960s by Italian archaeologist Paolo Matthiae and identified in 1975 as Ebla by tablets found during the excavation. Ebla was a focal point for the urban civilization of Syria and the center of a commercial network that stretched through the Near East and beyond. Particularly significant were the tablets found in the royal archive at Ebla; from these cuneiform writings we learn of the government and the everyday life of the ancient city. The tablets include the first known dictionaries, which recorded equivalents between Sumerian, used as a literary language, and Eblaite.

Mari, a second great urban culture of third millennium Syria, arose near what is now the border between Iraq and Syria. Mari was ruled by an Amorite dynasty that had originated from the pastureland of rural Syria. Opulent and sophisticated, the art and culture of Mari were more closely linked to the Mesopotamian tradition than to that of Ebla. Mari was destroyed around 1700 B.C. by the Babylonian king Hammu-rapi and never rebuilt. However, this Syro-Mesopotamian region continued to flourish; the citizens of the capital at Terqa had links with the Hittites to the north and the Egyptians to the west; cloves found during an excavation indicate that the Syrians of this era even had trade links with Indonesia and the Moluccas, the only known source of the spice at that time.

THE GREAT REGIONAL STATES. Clearly, such broad horizons were not accidental. The domain of urban civilization was expanding, and the political structures that accompanied it were growing apace. Toward the middle of the second millennium B.C. some radical transformations took place in the Near East that marked a sharp break between the two eras. The culture fracture that we witness around 1500 B.C. is, in our opinion, of greater consequence than the one that took place with the introduction of iron some five hundred years later. The introduction of iron is normally considered as significant because with it the "Bronze Age" came to an end; the impact on terminology, however, is perhaps greater than that on history. Let us consider the importance of what happened around 1500 B.C. first politically (with its socioeconomic ramifications) and then in terms of the history of technology.

Politically, the world of the Syro-Mesopotamian territorial states came to an end. In their stead around 1500 B.C. we find large regional states that extend beyond the borders of Syro-Mesopotamia: they have the distinction not only of being larger in size but also more complex in structure and quite different from each other in their internal composition and reciprocal relationships. In Mesopotamia we have for the first time the clear regional break-up into Babylonia in the south and Assyria in the north. Egypt initiates its policy of territorial expansion and military (if not quite administrative) control in southwestern Asia. The Hittites bring Anatolia (Asia Minor) into close contact with Syria, where yet another major regional state completes the configuration of these new major world powers: it is the kingdom of Mitanni, which controls the entire northern region from the Tigris to the Mediterranean.

Unlike the Amorite states of Syro-Mesopotamia, these new regional states were all quite different from each other, beginning with their ethnic and linguistic background. As for Mitanni, the great regional state of northern Syria, it

is centered in the upper Khabur (a bit north of Mari and Terqa), and it is heavily imbued with Hurrian (the third great urban culture of third millennium Syria) and Indo-European elements. Its capital is presumably to be found in the mound of Fekheriya, which has been excavated by German and American teams. (It is unfortunate that none of the major sites excavated by American teams in the recent past is represented in the exhibit Ebla to Damascus; certainly much of the material from these sites, especially Hadidi, Terqa, and Leilan, is at least equal in importance or greater than comparable examples chosen from other sites.)

The kings of Mitanni were on a par with the great powers: their letters have been found in the archive of the Egyptian pharaohs, with whom they intermarried. These letters, as is true of the other documents exchanged among the new regional kingdoms, were written for the most part in Akkadian, which, except for Assyria and Babylonia, was not the language of the parties involved: so foreign were these kingdoms to each other that they had the need for a common lingua franca of diplomacy—the first such case in history.

TECHNOLOGY FOR A NEW AGE: CONTROL OF NATURE. We have in our own age grown so accustomed to technological innovations that novelty has almost become a condition of quality. Can we still take enough distance from ourselves to appreciate what the impact of technological change can be when it is not taken for granted? So it has been for most of human history, although there were a few moments when innovations came in such prodigious clusters as to prefigure the technological bounties of our own era.

The beginning of civilization had been such a moment: large-scale architecture, the first industrial-type use of metal, complex sociopolitical structures, and, above all, perhaps, the introduction of writing in the service of a new capillary system of public administration. All these elements are well documented in



This standing deity (1400–1300 B.C.) from Ugarit cannot be securely identified, but it may be the storm god Adad, in which case the statue would have held a thunderbolt in its right hand. Photograph courtesy of SITES.

the first part of the Ebla to Damascus exhibit: in those areas Syria was a concurrent partner with the other major foci of civilization in the Near East.

Around 1500 B.C. a whole series of new technological advances took place that are more specifically identified with Syria. These changes have not yet been properly assessed in terms of general cultural history: even though they are well known in and of themselves, they have not been appreciated for what they mean when taken together.

On the Mediterranean littoral of Syria and in the fertile northeastern Khabur triangle we find the first documentation ever of some far-reaching new "inventions" that were to affect human history on all levels. The two innovations that took place in the northeast affected the relationship of man to nature in a primary way.

The best known is the domestication of the horse: what is remarkable is that this process entailed not just the taming of the animal (as it had been with earlier species such as dogs or cattle) but its training to respond to specific commands and perform specific tasks in close collaboration with the charioteer. That the uses of such technology should have been reserved for the military goes without saying! But what is even more remarkable about this event is that the whole process was described in a how-to manual, one of the first such manuals ever. And while in its extant version it comes from the Hittite archives outside of Syria, we know that both the cultural and linguistic origin of the manual, and of the "invention" itself, was the kingdom of Mitanni in northeast Syria.

The same is true of the second great technological innovation, which reflects a greater human control of the forces of nature. The first manufacturing of a new chemical substance, a completely man-made product—glass—originated at about the same time, in about the same area. Just as for the domestication of the horse, here too we have a technical instruction manual that describes the process of manufacturing. And here too actual manuals are found in later versions coming from outside the area (Assyria, in this case), but the early focus and the starting point of the process is northeast Syria, and the many excavations currently under way there may contribute the proper background for this phenomenon.

TECHNOLOGY FOR A NEW AGE: COMMUNICATIONS. The other two major technological innovations of the period are already well documented from Syrian evidence. They do not affect the natural world but rather the world of culture or, as we would say today, the world of information. The first is the introduction of a system of musical notation—yes, a mu-

sical score! The earliest known example of such a notational device comes from Ugarit, a city that is well represented in the exhibit Ebla to Damascus. The clay tablet on which the musical score was inscribed was originally thought to be a mathematical text, but the numbers turned out to be references to the strings of a musical instrument, hence "notes," written in conjunction with a lyric, most likely religious in content: song and music!

Presumably, the people of Ugarit came to write this down because the song originated from an earlier linguistic tradition of Syria (Hurrian) that was no longer well understood. They wanted text and music to be retained in their pure form, and for this a plain oral tradition was no longer deemed sufficient. Modern decoding of the score is still tentative, and a couple of interpretations (and corresponding musical renderings) of the text have been produced by scholars: but even if we cannot claim full accuracy, it is a very moving experience to tune our ears to this sound that is trying to break out of its clay embodiment to bring us the same musical experience our Syrian forebears had some thirty-five hundred years ago.

The last innovation is the best known of all. What the microchip did for the computer industry, the alphabet did for writing—and its introduction and first general use is attested from the ancient Syrian city of Ugarit. So closely is it identified with the city, in fact, that the first full-fledged alphabetic script is called "Ugaritic." Some of the Ugaritic tablets shown in the Ebla to Damascus exhibit are written in this script: they are shown side by side with tablets in "syllabic" cuneiform, also written in Ugarit, and used for the purposes of international correspondence with foreigners who had not yet made the jump to the new Syrian technology. (Tradition has such a strong momentum that it is hard to shed even when new technology can prove it an unnecessary burden—witness today the absurdity of the English spelling system, with which, however, we have all chosen to live.)

Here too, as with the other "inventions" of this period, we have a technical document of the first order: a tablet that records, with the utter majesty of simplicity, nothing but the alphabet itself. It is a tablet of such supreme cultural import that it was not considered safe enough to export it for use in the exhibit; it is well worth a trip to the museum in Damascus just for its own sake.

But the Ebla to Damascus exhibit gives superb evidence of the overall cultural background that made the flourishing of such inventiveness and imagination possible. The style exhibited by the art of Ugarit is as impressive as the wealth that it displays: gold and precious stones are

(Continued on page 28)



A religious text (an incantation against snakebite; 1300–1200 B.C.) written in a cuneiform script peculiar to Ugarit: it is the first alphabetic script, where each sign stands for a sound and is hence much easier to learn than the earlier syllabic cuneiform used at Ebla and Mari. Photograph courtesy of SITES. The text translates as follows: "The mother of the stallion, the mare, the daughter of the source, daughter of the stone, daughter of heaven, daughter of the underworld invokes (the sun goddess) Shapash, her mother: Shapash, mother, bring my word to (the chief god) El at the source of the two rivers, at the place where the two depths flow together! (This is) the incantation against the snake bite, the poison of the scaly snake: destroy it and remove the poison. But see he lifts up the snake, feeds the scaly snake, places a chair and sits down.... Recite the incantation around the houses, around the locked houses, around the bronze locks. Open up the house for the incantation, open up the house so that I (the god), Horon, can enter. Open up the palace so that I can enter. As dowry, give me snakes: give me lizards as my wedding gift, snake babies as my present. Now I'll give you snakes as your dowry, baby snakes as your present." Translation by Wolfgang Röllig.

The ancient Syrians crafted elaborate wooden furniture inlaid with carved ivories, which were sometimes given as presents to ruling princes. This ivory carving (850–800 B.C.) shows a cow licking her newborn calf. The motif appears in an Ugaritic text: “Like the heart of a cow longs for her calf, like the heart of a sheep longs for her lamb, so does the heart of Anat long for Baal.” Photograph courtesy of SITES.



This necklace from Mari (crafted around 1200 B.C.) is an artifact left by a small population that lived at the city after it had been destroyed by the Babylonian king Hammu-rapi. Quadrupled rolled gold spirals are combined with beads of agate, carnelian, and lapis lazuli, which form a strikingly colorful arrangement. Photograph courtesy of SITES.



This relief, showing two Assyrian court officials, was painted at a time (around 750 B.C.) when the Assyrians had conquered much of Syria. The heavy emphasis on the eyes and the patterning of the beards are typical of Assyrian wall painting. Few of these paintings still exist. Photograph courtesy of the Denver Museum of Natural History.

This ivory (850–800 B.C.) carved in an open technique showing two sphinxes facing a central stylized tree was also part of an inlaid furniture piece. These sphinxes have ram heads and wings. Photograph courtesy of SITES.





Clockwise from top, left: A bearded man shooting a bow and arrow is carved here on a small basalt block (900–850 B.C.). He is part of a more complex scheme that had been set up along the outer wall of a temple-palace in northern Syria. Photograph courtesy of SITES.

A mountain god flanked by two bull-men combines both Anatolian and Mesopotamian artistic traditions (1000–900 B.C.). Photograph courtesy of SITES.

Vessels shaped in animal or human form are a very old tradition in Syrian art. This vessel, which probably contained incense or spices, is in the form of a Nubian boy. Photograph courtesy of the Denver Museum of Natural History.

Syria and Surrounding Empires





In the city of Palmyra the meeting of the Roman West and the Syrian East was reflected in its art. This idealized funerary monument (A.D. 150–200) shows a woman identified in an inscription as Aqmat. Photograph courtesy of SITES.

This Koran (1689) is written in black ink on paper and illuminated in many colors. The binding is particularly rich—it is made of leather and stamped with two tones of gold. Photograph courtesy of the Denver Museum of Natural History.



EBLA TO DAMASCUS

Ebla to Damascus: Art and Archaeology of Ancient Syria, on display at the Natural History Museum from March 15 to June 1, 1986, is an unprecedented exhibition of nearly 300 archaeological and artistic treasures from the National Museums of Syria representing 10,000 years of cultural developments. *Ebla to Damascus* tells a tale of this unique culture symbolized by ancient Ebla at one end of the chronological spectrum and modern Damascus at the other. This exhibit is cosponsored by Occidental Petroleum Corporation and the Los Angeles County Natural History Museum Foundation.

TICKETS

Each museum membership receives 2 free tickets to *Ebla to Damascus*. Additional tickets are \$4 for adults and \$1 for children (5–12) and senior citizens. Tickets purchased at the museum's Membership Office have no handling charge; there is a \$1 handling fee for each ticket order processed through the mail and a \$1 service charge for each purchased ticket. Tickets may also be obtained through Ticketmaster outlets at the May Company or Music Plus or charged by phone. Tickets entitle holders to visit all museum exhibits. Special exhibit hours are 10 to 5 Tuesday through Thursday, 10 to 8 on Friday, and 10 to 6 on Saturday and Sunday. The museum is closed on Mondays. Entrance to the exhibit will be through the East (Rose Garden) doors.

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once more in full evidence, as at Ebla or Mari in earlier periods, and they are fused together with ivory and stone with very secure craftsmanship and with a masterful sense of elegance.

The second half of the second millennium B.C. represents one of the major turning points in world history, with Syria playing a pivotal role in the development. Whether through the great regional state of Mitanni, or through the wealthy and sophisticated harbor cities of the Mediterranean coast, Syria proposed at this time some major new formulas of civilized life and well-being. What is perhaps most remarkable, intellectually, is not only the openness to innovation and change, but especially the determination to provide a crystallized embodiment for the new experience. The "manuals" we have just referred to and above all the alphabet tablet of Ugarit, with all its noble simplicity, represent some of the supreme cultural formulas of all times.

INFRASTRUCTURE OF EMPIRE: THE

ARAMEANS. The political structures that followed the great cosmopolitan age of the late second millennium were on a scale much larger than anything known previously. We call it "empire," and it was truly so, a universal state that imposed uniform administrative structures over people of different background and culture. In its early form the empire was dominated by the Assyrians, at home in northeastern Mesopotamia and thus outside Syria. What Syria contributed to the empire was, we might say, its ethnic infrastructure. The Arameans were at home in the Syrian steppe, which had already served as the pastureland of the Amorites in the early periods: here and in the adjacent river valleys they gave rise to a series of territorial states with their own characteristic art, of which the sculpture is especially well represented in the exhibit. Their works have a unique quality, a freshness that seems to mark a new beginning on the seemingly unbroken trajectory of formal expression that had characterized the course of early Syrian art.

As their states came to be subsumed more and more under the ever-encroaching political arm of Assyria, the Arameans spread as a people beyond their original enclave. Their language came to be used beyond the limits of Syria, to the point that they achieved for the first millennium what the Amorites had not succeeded in doing for the second: Aramaic came to be the common language of the empire, the language that was most universally spoken, perhaps already under the Assyrians, and then even more so under the Persians in the sixth century B.C. The lingua franca now

This elaborate gold bracelet (1000–1100), made from gold foil, is inscribed with a prayer for blessings and happiness for the owner: "Lasting power/permanent happiness/eternal success/true, pious blessing/complete grace, prosperity/lasting, eternal power/perseverance, kindness/constant happiness/to the owner." Gold or silver bracelets were worn in pairs on the wrist or upper arm. Photograph courtesy of SITES.



The Romans built this road of limestone blocks west of Aleppo 1,800 years ago. Photograph by James L. Stanfield, © National Geographic Society.



Palmyra, long a prosperous resting station for caravans, under Roman rule became the most important trading center in the Orient. In the third century A.D. The Palmyrene queen Zenobia conquered Roman provinces from Egypt to Asia Minor before the Emperor Aurelian ended her revolt. Photograph by James L. Stanfield, © National Geographic Society.



was no longer that of the ruling chancery at the top but that of an originally rural people at the base.

THE HISTORICAL CENTRALITY OF SYRIA. Beyond the ancient world, the exhibit Ebla to Damascus covers a second major portion of Syrian history, which we cannot cover here. Whether it is the Seleucid dynasty (the dynasty that arose in the wake of Alexander the Great) in Hellenistic times or the caravan cities of Palmyra and Dura-Europos in the so-called late Antique period (Roman and Parthian, a Persian empire), or especially the splendor of the early Islamic period—Syria retained a central role in the development of Western history. The magnificent works of art of these periods, documented by the exhibit, will leave an indelible mark on even the most casual visitor.

The reflection with which we may close our brief review of the significance of this splendid civilization has to do precisely with such centrality. In the average historical perception, Syria had been viewed as central only in its role of a bridge to adjoining civilizations that were presumed to hold the key to the major unfolding of history. The wealth of new data that has come from excavations has begun to impose a new historical paradigm: Syria was central not as a threshold to something else but as a major crucible in which the mold of civilization was itself being shaped.

Ebla to Damascus is indeed an apposite title not only for the exhibit but for this entirely new paradigm. Ebla on the one hand stands for the earliest urban civilizations that found a very specific mold in their Syrian variety vis-à-vis those of Egypt and southern Mesopotamia. Damascus, on the other hand, stands for that major component of Western civilization, Islam, which only too often we view through the window of a Euro-centric historical paradigm. To the extent that it can help us rid ourselves of a parochial perspective of history, this exhibit will have performed a greater task than that of identifying the greatness of the Syrian cultural tradition—it will have enlarged and refined our Western awareness for the fuller significance of our most ancient civilizational past.

Giorgio Buccellati and Marilyn Kelly-Buccellati are a husband and wife team who have worked together for many years in the Near East, especially in Syria, Iraq, and Turkey. Dr. Giorgio Buccellati is Professor of the Ancient Near East and of History at UCLA, and Dr. Marilyn Kelly-Buccellati is Professor of Art History and Archaeology at California State University Los Angeles.

BE PART OF THE SEVENTY-FIFTH ANNIVERSARY CAMPAIGN

Detailed information about named gift opportunities, as well as the various ways of making a pledge or contribution and their respective tax implications is available through members of the Seventy-Fifth Anniversary Campaign Committee or from the Museum Foundation staff.

For further information, please write to Dr. Kenneth J. Daponte, Executive Vice President, Natural History Museum Foundation, 900 Exposition Boulevard, Los Angeles, CA 90007, or call Dr. Daponte at 213/744-3307.

tors a new appreciation and understanding of birds, an integral part of the project will be the incorporation of a research center, dedicated to the scientific study of the museum's vast collections of birds and small mammals. Dr. Schreiber said that the design phase will be completed by autumn 1986 and that construction will be under way by next year at this time.

BUSINESS ASSOCIATES PROGRAM GROWS. The Natural History Museum's Business Associates program comprises corporations and corporate foundations that recognize the museum to be of unquestioned value to the community at large and their employees in particular. Through the Business Associates the museum is building stronger links to the corporate community and is thus better able to offer creative new exhibitions as well as a variety of educational programs for both children and adults. The Business Associates program is helping to ensure and enhance a rich historical and natural sciences heritage for present and future generations of Californians.

This year, the Board of Trustees Business Associates Committee, led by Chairman Dan L. McGurk and Trustees A. Frederick Gerstell and Stephen R. Onderdonk, has set a goal of \$285,000—a significant increase over last year's record-setting total of \$210,000 in contributions.

Seventy-seven member companies currently contribute from \$2,000 to \$10,000 each year. In addition to re-

ceiving full membership privileges, representatives of the member companies are given invitations to special museum events, and each company is recognized on a plaque at the museum's north entrance. Beginning this year, the \$10,000 Corporate Leaders will have their own "Employee Day" at the museum—one day each year when all company employees may visit the museum free of charge.

Since July 1, 1985, twenty-six new companies and corporate foundations have joined the Business Associates, including such nationally known companies as Anheuser-Busch, AT&T, Citicorp (USA), Deloitte, Haskins & Sells, Englehard Corporation, Ford, Honda, Lederle Laboratories, Nissan, Toyota, and Xerox as well as these major California companies: Bullock's/Bullocks Wilshire, California First Bank, Chandis Securities, Coast Savings, Galpin Ford, Maguire/Thomas Partners, MSI International, Petersen Publishing, Southern California Edison, Spacesaver Systems, Taft Entertainment, Ticketmaster, Titan Corporation, Wells Fargo Bank, and Zimmerman Holdings.

"The corporate community is responding to the challenge to ensure the cultural, educational, and scientific quality of life in southern California," said Robert S. Attiyeh, President of the Natural History Museum Board of Trustees. "It's just good business."

For more information about the Business Associates, please call Dr. Donald J. Gross in the Foundation Office at 213/744-3307.

MUSEUM FELLOWS GAIN MEMBERS. The Fellows, a key group providing annual financial support to the Natural History Museum, has added thirty-one new members in the last six months as a result of the efforts of the Museum Fellows Committee, which is cochaired by Louise Cavanaugh Griffith, a Natural History Museum Foundation Trustee, and Neal Brockmeyer, Alliance Director.

Because of the Fellows' support, the museum has been able to move forward to secure major traveling shows for the coming year, including Hollywood: Legend and Reality. This is the largest exhibition ever mounted on the history and cultural impact of motion pictures, and it is slated to open at the museum in December 1987.

Museum Fellows contribute between \$1,000 and \$10,000 on an annual, unrestricted basis. These funds enable the museum to bring in the finest and most exciting traveling exhibits available. In recognition of their support, Fellows receive invitations to exhibition openings and other important museum events, special museum use privileges, and preferred parking for Coliseum and Sports Arena events.

If you would like more information about the Museum Fellows, please telephone or write Fellows Coordinator Michael Bell at the Foundation Office, 213/744-3438.

NEW MUSEUM SUPPORT GROUP FORMED. To recognize those individuals, couples, corporations, and foundations that contribute at least \$1,000 a year toward specific museum projects or donate artifacts or gifts-in-kind that have a value of \$5,000 or more, the museum has formed a new support group, the Distinguished Friends.

More than ninety current Distinguished Friends enjoy the same benefits as Museum Fellows, including museum membership, invitations to exhibition openings and other special events, in addition to recognition on a special plaque at the museum's north entrance.

For further information on the Distinguished Friends, please call Dr. Donald J. Gross at 213/744-3307.

BOOK REVIEWS

ALL THE WORLD'S A FAIR: VISIONS OF EMPIRE AT AMERICAN INTERNATIONAL EXPOSITIONS, 1876-1916 by Robert W. Rydell, University of Chicago Press, 1985. Hardbound, 328 pp., illustrations, \$27.50.

Between Reconstruction and World War I, twelve international expositions were held in major U.S. cities. These fairs offered people here and abroad a vision of an America rich in economic, intellectual, and artistic resources, which combined to place it on the path to steady progress that would lead to perfection on earth.

In *All the World's a Fair*, the author takes the reader on an excursion through America's world's fairs from 1876 to 1916, beginning with the Centennial Exhibition in Philadelphia (1876) and including the Chicago World's Columbian Exposition (1893), the Louisiana Purchase Exposition in Saint Louis (1904), the Panama-Pacific International Exposition in San Francisco (1915), and, finally, the Panama-California Exposition in San Diego (1915-1916).

While the work's subtitle, *Visions of Empire...*, might indicate a broader approach to what most certainly is a kaleidoscopic subject, the author has chosen to focus relentlessly on only one element of imperialism: racism. Because of this Rydell's subject is not—as the title might imply—the fairs' influence on the American public to exercise their Manifest Destiny on a global scale but rather how the fairs presented to that same audience what passed for ironclad scientific evidence of the unquestionable superiority of the white race.

Anthropologists, principally from the Smithsonian Institution, organized ethnological exhibits that manifested a virulent social Darwinism cloaked in pseudo-scientific garb. The all-pervasive racism of these displays found itself not just buttressed but amplified by the introduction of midways, which began with the Chicago fair in 1893. Among other vulgar attractions, midways featured mindlessly demeaning examples of "natives" in their "villages." Such "barbarians," as they seem to have been perceived, were there to be gawked at and were intended by the fairs' various promoters, according to the author, to demonstrate the superiority of white bourgeois culture whose contemporary apotheosis the fairs were intended to serve.

Despite the fact that midways and

their various amusements had served to entertain millions at circuses and carnivals in the past, for the author they and their execrable exhibits were the unique contribution of world's fairs to the nation's "visions of empire." From the Midway Plaisance on the outskirts of the Chicago exposition to the Joy Zone in the heart of the San Diego exposition, "midway entertainments had come into their own, which is to say...that they simultaneously gained legitimacy and offered legitimacy to a particular view of the world—one that was avowedly imperialistic."

Mr. Rydell concludes that the world's fair midways, far from being fun zones, "reflected the growing efforts of the upper classes, threatened by class conflict at every turn, to influence the content of popular culture. Their centrality to American culture and to the efforts by American elites to establish their cultural hegemony is CERTAIN." The perils of the study and interpretation of popular culture are many, the tendency to such authorial certainty being just one of them. Mr. Rydell might have written a better book had he not chosen to subsume the arguably confusing, multifaceted nature of the fairs to his monomaniacally narrow focus on their racism. As it is, however, the work remains a stimulating and controversial interdisciplinary synthesis that demands attention from serious students of the turbulent forty years covered by *All the World's a Fair*.

David M. Debs
Curatorial Assistant
Cultural History

OTHER BOOKS RECEIVED BY TERRA

THE BRONX IN THE INNOCENT YEARS, 1890-1925 by Lloyd Ultan and Gary Hermalyn, Harper & Row, 1985. Volume 2 of a three-volume informal history of the Bronx, this book recalls a time when a pail of draft beer cost a dime and Bronx residents could earn \$2 a day working in D. W. Griffith's local studio. Includes over eighty photographs from the archives of the Bronx County Historical Society. Hardbound, \$19.95.

THE FLAMINGO'S SMILE: REFLECTIONS IN NATURAL HISTORY by Stephen Jay Gould, W. W. Norton, 1985. Dr. Gould's fourth volume of essays

collected from his *Natural History* column, including his explorations of the meanings and causes behind mass extinctions, sexual cannibalism, and the disappearance of the .400 hitter in baseball. Hardbound, 476 pp., \$19.95.

ANCIENT MEXICO: AN OVERVIEW by Jaime Litvak King, University of New Mexico Press, 1985. An engaging and brief overview of Mexico before the Spanish conquest written by the director of the Instituto de Investigaciones Arqueológicas at the National Autonomous University of Mexico. 134 pp., hardbound, \$12.95, paper, \$6.95.

COXEY'S ARMY: AN AMERICAN ODYSSEY by Carlos A. Schwantes, University of Nebraska Press, 1985. On May 1, 1884, following the depression of 1893, thousands of unemployed people from western and midwestern states (including groups from Los Angeles and San Francisco) converged on Washington, D.C. Led by Jacob S. Coxey, a wealthy Ohio landowner, the petitioners who joined this first protest march on the nation's capital hoped to persuade Congress and President Cleveland to create public-works jobs and increase the money supply to stimulate the American economy. Hardbound, 321 pp., \$22.95.

THE ADVENTURE OF ARCHAEOLOGY by Brian M. Fagan, National Geographic Society, 1985. Traces archaeology's evolution from an adventurous treasure hunt into a scientific pursuit of humanity's past. Richly illustrated, the book tells the stories behind the great discoveries, from Egypt to Ebla, from Maya ruins to the treasures of Mycenae. This 368-page hardcover book can only be ordered from the National Geographic Society, Department 100, Washington, D.C. 20036 (\$24.95 plus \$3.25 for postage and handling).

The World of Science Series: **THE WORLD BENEATH US** by Anita McConnell, **PLANTS** by David Black and Anthony Huxley, and **THE INVISIBLE WORLD** by Ron Taylor, Facts on File, 1985. Written for younger readers and lavishly illustrated, these books discuss geology, botany, and natural phenomena that cannot be seen—gases, energy, and atomic structure. The books contain indexes and glossaries explaining unfamiliar terms. Hardbound, 64 pp. each, \$9.95.



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New types of dinosaurs in all shapes and sizes have invaded the Dinosaur Shop in celebration of the exhibit Dinosaurs: Past and Present. They take the form of banks, chocolates, inflatable toys, clocks, and soaps. They decorate T-shirts, ties, glasses, mugs, and tote bags. We even have a hand-crafted dinosaur teapot with matching cups!

Come in and discover your favorite new dinosaur...where else, but in the Dinosaur Shop!

THE DINOSAUR SHOP

Natural History Museum
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Los Angeles, CA 90007
(213) 744-3489
Hours: 10 a.m. to 4:45 p.m. daily,
except Mondays.